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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS

Appellants:	John Donohue	**APPEAL BRIEF**
Serial No.	09/433,332	
Filing Date	November 3, 1999	
Group Art Unit	2665	
Examiner	Daniel J. Ryman	
Attorney Docket No.	100.115US01	
Title: DIGITAL RETURN PATH FOR HYBRID FIBER/COAX NETWORK		

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1. Real Party in Interest

The real party in interest in the above-captioned application is the assignee ADC Telecommunications, Inc.

2. Related Appeals and Interferences

There are no other appeals or interferences known to Appellants which will have a bearing on the Board's decision in the present appeal.

3. Status of the Claims

Claims 1-29 are pending in the application and are the subject of this appeal. In a final office action mailed April 25, 2003, claims 1-29 were rejected under 35 U.S.C. § 103(a).

4. Status of Amendments

An amendment was filed on October 31, 2003 (after the Notice of Appeal) complying with the Examiner's requirement to correct the word processing error in claim 18. No decision on entry of this amendment has been received.

5. Summary of the Invention

In one embodiment, a hybrid fiber/coax network (100) is provided. The network includes a head end (102), at least one optical distribution node (106) coupled to the head end over at least one fiber optic link (105, 115) and at least one coaxial cable link (108-1, . . ., 108-M) that is coupled to the at least one optical distribution node. The at least one coaxial cable link receives upstream, digital data from a plurality of modems (103-1-1, . . ., 103-M-N). The at least one optical distribution node has a digital return path that includes a laser transmitter (142) coupled to the fiber optic link that transmits the upstream, digital data to the head end, and a data concentrator (136) coupled to provide the upstream, digital data to the laser. The at least one optical distribution node also includes, for the at least one coaxial cable link, a frequency translator (124) that receives and translates the upstream, digital data from the plurality of

modems to a different carrier frequency and retransmits the signal to the plurality of modems for collision detection, and a data interface (138, 140) coupled between frequency translator and the data concentrator that determines whether a collision occurred with the upstream, digital data so as to prevent corrupted upstream, digital data from being passed on to the head end. One embodiment is described, for example, in the specification beginning on page 4, line 2 and ending on page 7, line 28.

Many variations of this embodiment are also provided. For example, in one variation, at least a portion of the upstream, digital data is transmitted over the at least one coaxial cable link on modulated carriers below 42 MHZ. *See*, *e.g.*, Specification, p. 6, lines 1-2. In other variations, the modulated carriers are modulated with the upstream, digital data using one of on-off-keying, quadrature phase-shift keying and quadrature amplitude modulation. *See*, *e.g.*, Specification, p. 5 lines 24-30. In still other embodiments, the upstream, digital data is carried on one of at least two modulated carriers. *See*, *e.g.*, Specification, p. 5, lines 24-27. In yet other embodiments, the plurality of modems transmit collision detection signals on a different modulated carrier when a collision is detected based on signals from the frequency translator. *See*, *e.g.*, Specification, p. 6, lines 22-23. In other embodiments, the upstream, digital data comprises Ethernet packets. *See*, *e.g.*, Specification, p. 5, lines 24-27. In other embodiments, at least another portion of the upstream, digital data is transmitted over the plurality of coaxial cable links on modulated carriers above a cut-off frequency for downstream transmissions. *See*, *e.g.*, Specification, p. 6, lines 2-4. In other embodiments, the laser transmitter transmits the upstream, digital data as one of base-band and modulated carrier transmission. *See*, *e.g.*, Specification, p. 5, lines 5-7. In other embodiments, the network includes a receiver circuit coupled to the fiber optic link and the at least one coaxial cable link that receives downstream optical signals and converts the signals to electrical signals for transmission over the at least one coaxial cable link. *See*, *e.g.*, Specification, p. 4, line 30 to p. 5, line 2.

In one embodiment, a hybrid fiber-coax network is provided. The network includes a

head end (102), at least one optical distribution node (106) coupled to the head end over at least one fiber optic link (105, 115) to provide upstream, digital data to the head end, and at least one coaxial cable link (108-1, . . ., 108-M), coupled to the at least one optical distribution node, that receives the upstream, digital data from a plurality of modems. At least a portion of the upstream, digital data is transmitted over the at least one coaxial cable link on at least one modulated carrier below a frequency range for downstream transmission. *See*, Specification, p.6, lines 1-9. The at least one optical distribution node includes circuitry for retransmitting upstream, digital data back over the at least one coaxial cable link (e.g., 124) to detect collisions on the at least one coaxial cable link. *See,* Specification, p. 6, lines 13-27.

Many variations of this embodiment are also provided. For example, in one variation, the modulated carriers are modulated with the upstream, digital data using one of on-off-keying, quadrature phase-shift keying and quadrature amplitude modulation. *See*, *e.g.,* Specification, p. 5 lines 24-30. In another variation, the upstream, digital data is carried on one of at least two modulated carriers. *See*, *e.g.,* Specification, p. 5, lines 24-27. In yet a further variation, the plurality of modems transmit collision detection signals on a different modulated carrier when a collision is detected based on signals from a frequency translator. *See*, *e.g.,* Specification, p. 6, lines 22-23. In still another embodiment, the upstream, digital data comprises Ethernet packets. *See*, *e.g.,* Specification, p. 5, lines 24-27. In another variation, at least another portion of the upstream, digital data is transmitted over the at least one coaxial cable link on modulated carriers above a cut-off frequency for the downstream transmissions. *See*, *e.g.,* Specification, p. 6, lines 2-4. In other variations, the at least one optical distribution node transmits the upstream, digital data as one of base-band and modulated carrier transmission. *See*, *e.g.,* Specification, p. 5, lines 5-7. In other embodiments, the network includes a receiver circuit coupled to the fiber optic link and the at least one coaxial cable link that receives downstream optical signals and converts the signals to electrical signals for transmission over the at least one coaxial cable link. *See*, *e.g.,* Specification, p. 4, line 30 to p. 5, line 2.

In one embodiment, an optical distribution node (106) for an hybrid fiber/coax network (100) is provided. The optical distribution node includes a laser transmitter (142) coupleable to a fiber optic link (105) that transmits upstream, digital data to a head end (102) of the network. The optical distribution node also includes a data concentrator (136) coupled to provide the upstream, digital data to the laser. For at least one coaxial cable link of the network coupleable to the optical distribution node, the optical distribution node also includes a frequency translator (124) that receives the upstream, digital data modulated on a first carrier frequency from a plurality of modems and translates the upstream, digital data to a different carrier and retransmits the upstream, digital data to the plurality of modems for collision detection. Further, the optical distribution node also includes a data interface (138, 140) coupled between the at least one coaxial cable link and the data concentrator that determines whether a collision occurred with the upstream data so as to prevent corrupted upstream, digital data from being passed on to the head end. *See,* Specification, p. 5, line 19 to p. 7, line 28.

Many variations of this embodiment are also provided. For example, in one variation, the optical distribution node also includes at least one media access unit coupled to the at least one coaxial cable link and the data concentrator. *See*, *e.g.*, Specification, p. 6, line 28 to p. 7, line 2. In another variation, the upstream, digital data comprises Ethernet packets. *See*, *e.g.*, Specification, p. 5, lines 24-27. In yet another embodiment, the laser transmitter transmits the upstream, digital data as one of base-band and modulated carrier transmission. *See*, *e.g.*, Specification, p. 5, lines 5-7. In yet another variation, the frequency translator also receives upstream, digital data on at least one additional carrier. *See*, *e.g.*, Specification, p. 5, lines 24-27. In yet a further variation, the frequency translator receives the upstream, digital data modulated on a first carrier with a frequency that is below the frequency range for downstream transmissions. *See*, *e.g.*, Specification, p. 6, lines 1-2.

In one embodiment, a method for processing data in a return path of a hybrid fiber/coax network is provided. The method includes receiving, on a first coaxial cable (e.g., 108-1),

upstream, digital data modulated on a first carrier (f1), translating the frequency of the first carrier to a second frequency (f2), retransmitting the upstream, digital data modulated on the carrier with the second frequency, checking for collision detection signals based on the retransmitted upstream, digital data (138, 140), concentrating the upstream, digital data with upstream, digital data from other coaxial cables (136), and, transmitting the concentrated, upstream, digital data to the head end (142). *See, e.g.,* Specification, p. 6, line 13 to p. 7, line 20.

Many variations of this embodiment are also provided. For example, in one variation, receiving digital data comprises receiving digital data on a first carrier below a frequency range for downstream transmission. *See*, *e.g.,* Specification, p. 6, lines 1-2. In a further variation, translating the frequency of the first carrier comprises translating the frequency of the first carrier to a second frequency below the frequency used for downstream transmission. *See*, *e.g.,* Specification, p. 6, lines 1-9, and 13-16 and p.13, lines 21-23. In yet a further variation, checking for collision detection signals comprises monitoring a third frequency for collision detection signals. *See*, *e.g.,* Specification, p. 6, lines 22-23. In a further variation, transmitting the concentrated, upstream, digital data comprises transmitting base-band signals as one of base-band and modulated carrier transmission. *See*, *e.g.,* Specification, p. 5, lines 5-7. In a further variation, receiving, on a coaxial cable, upstream, digital data comprises receiving Ethernet packets on a modulated carrier. *See*, *e.g.,* Specification, p. 5, lines 24-27.

6. Issues Presented for Review

1. Whether the Examiner was correct in rejecting claims 1-4, 6, 9, 18, 20, 22, and 23 under 35 USC § 103(a) as being unpatentable over Dapper (U.S. Patent No. 6,282,683) in view of Chan et al. (U.S. Patent No. 4,816,825) and further in view of Eng et al. (U.S. Patent No. 4,754,451)?

2. Whether the Examiner was correct in rejecting claim 5 under 35 USC § 103(a) as being unpatentable over Dapper (U.S. Patent No. 6,282,683) in view of Chan et al. (U.S. Patent No. 4,816,825) and further in view of Eng et al. (U.S. Patent No. 4,754,451) and further in view

of Kavehrad et al. (U.S. Patent No. 4,701,909) in further view of Griesing (U.S. Patent No. 4,959,829)?

3. Whether the Examiner was correct in rejecting claim 7 under 35 USC § 103(a) as being unpatentable over Dapper (U.S. Patent No. 6,282,683) in view of Chan et al. (U.S. Patent No. 4,816,825) and further in view of Eng et al. (U.S. Patent No. 4,754,451) and further in view of Peyrovian (U.S. Patent No. 5,768,682)?

4. Whether the Examiner was correct in rejecting claims 8 and 21 under 35 USC § 103(a) as being unpatentable over Dapper (U.S. Patent No. 6,282,683) in view of Chan et al. (U.S. Patent No. 4,816,825) and further in view of Eng et al. (U.S. Patent No. 4,754,451), and further in view of Beveridge (U.S. Patent No. 5,469,495)?

5. Whether the Examiner was correct in rejecting claim 19 under 35 USC § 103(a) as being unpatentable over Dapper (U.S. Patent No. 6,282,683) in view of Chan et al. (U.S. Patent No. 4,816,825) and further in view of Eng et al. (U.S. Patent No. 4,754,451), and further in view of Hutchison (U.S. Patent No. 5,838,989)?

6. Whether the Examiner was correct in rejecting claims 10-12, 14, and 17 under 35 USC § 103(a) as being unpatentable over Dapper (U.S. Patent No. 6,282,683) in view of Chan et al. (U.S. Patent No. 4,816,825)?

7. Whether the Examiner was correct in rejecting claim 13 under 35 USC § 103(a) as being unpatentable over Dapper (U.S. Patent No. 6,282,683) in view of Chan et al. (U.S. Patent No. 4,816,825) and further in view of Kavehrad et al. (U.S. Patent No. 4,701,909) in further view of Griesing (U.S. Patent No. 4,959,829)?

8. Whether the Examiner was correct in rejecting claim 15 under 35 USC § 103(a) as being unpatentable over Dapper (U.S. Patent No. 6,282,683) in view of Chan et al. (U.S. Patent No. 4,816,825), and further in view of Peyrovian (U.S. Patent No. 5,768,682)?

9. Whether the Examiner was correct in rejecting claim 16 under 35 USC § 103(a) as being unpatentable over Dapper (U.S. Patent No. 6,282,683) in view of Chan et al. (U.S. Patent No. 4,816,825), and further in view of Beveridge (U.S. Patent No. 5,469,495)?

10. Whether the Examiner was correct in rejecting claims 24, 25, and 29 under 35 USC § 103(a) as being unpatentable over Dapper (U.S. Patent No. 6,282,683) in view of Chan et al. (U.S. Patent No. 4,816,825) in further view of Usui (U.S. Patent No. 4,534,239)?

11. Whether the Examiner was correct in rejecting claim 26 under 35 USC § 103(a) as being unpatentable over Dapper (U.S. Patent No. 6,282,683) in view of Chan et al. (U.S. Patent No. 4,816,825) in further view of Usui (U.S. Patent No. 4,534,239), and further in view of Peyrovian (U.S. Patent No. 5,768,682)?

12. Whether the Examiner was correct in rejecting claim 27 under 35 USC § 103(a) as being unpatentable over Dapper (U.S. Patent No. 6,282,683) in view of Chan et al. (U.S. Patent No. 4,816,825) in further view of Usui (U.S. Patent No. 4,534,239) and further in view of Griesing (U.S. Patent No. 4,959,829)?

13. Whether the Examiner was correct in rejecting claim 28 under 35 USC § 103(a) as being unpatentable over Dapper (U.S. Patent No. 6,282,683) in view of Chan et al. (U.S. Patent No. 4,816,825) in further view of Usui (U.S. Patent No. 4,534,239) and further in view of Beveridge (U.S. Patent No. 5,469,495)?

7. Grouping of Claims

Claims 1-29 each stand or fall on their own merits.

8. Argument

i. The Applicable Law

35 U.S.C. § 103 provides in relevant part:

Conditions for patentability; non-obvious subject matter.

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter

pertains. Patentability shall not be negatived by the manner in which the invention was made.

"The ultimate determination . . . whether an invention is or is not obvious is a legal conclusion based on underlying factual inquiries including: (1) the scope and content of the prior art; (2) the level of ordinary skill in the prior art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness." *In re Dembiczak*, 175 F.3d 994, 998, 50 USPQ2d 1614, 1616 (1999) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966)).

When applying 35 U.S.C. §103, the claimed invention must be considered as a whole; the references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination; the references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention and a reasonable expectation of success is the standard with which obviousness is determined. *Hodosh v. Block Drug Co., Inc.*, 786 F.2d 1136, 1143 n.5, 229 USPQ 182, 187 n.5 (Fed. Cir. 1986).

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *See*, MPEP 2143.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. MPEP 2143 citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Moreover, the proposed modification cannot render the prior art unsatisfactory for its intended purpose. MPEP 2143 citing *In re Gordon,* 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984) and *In re Dance,* 160 F.3d 1339, 1344, 48 USPQ2d 1635, 1638 (Fed. Cir. 1998).

ii. Analysis -35 U.S.C. §103(a) Rejections

1. The Examiner finally rejected claims 1-4, 6, 9, 18, 20, 22, and 23 under 35 U.S.C. §103(a) as being unpatentable over Dapper et al. (U.S. Patent No. 6,282,683) in view of Chan et al. (U.S. Patent No. 4,816,825) and further in view of Eng et al. (U.S. Patent No. 4,754,451). Applicant respectfully requests that the Board reverses the rejection.

Claim 1:

Claim 1 is directed to a hybrid fiber/coax network with a head end and at least one optical distribution node coupled to the head end over at least one fiber optic link. The network also includes at least one coaxial cable link that is coupled to the at least one optical distribution node. The at least one optical distribution node receives upstream, digital data from a plurality of modems. The at least one optical distribution node further has a digital return path that includes a laser transmitter coupled to the fiber optic link that transmits the upstream, digital data to the head end, a data concentrator coupled to provide the upstream, digital data to the laser, and, for the at least one coaxial cable link, a frequency translator that receives and translates the upstream, digital data from the plurality of modems to a different carrier frequency and retransmits the signal to the plurality of modems for collision detection and a data interface coupled between frequency translator and the data concentrator that determines whether a collision occurred with the upstream, digital data is so as to prevent corrupted data from being passed on to the head end.

None of the references, alone or in combination, teach or suggest the network of claim 1. For example, none of the references, alone or in combination, teach or suggest a hybrid fiber/coax network that includes an upstream, digital data path as called for in claim 1. None of the references, alone or in combination, teach or suggest a data path that uses a shared frequency

band for upstream communication over a coaxial cable from a plurality of modems to a optical distribution node with a data interface in the optical distribution node that determines whether data is corrupted due to collision prior to forwarding the data to a data concentrator for transmission to a head end for possible transmission outside the system.

Further, the combination of Dapper and Chan is not proper. Chan appears to be concerned with power levels in a closed cable network that transports digital data. *Chan*, Col. 3, line 65 to Col. 4, line 21. Although Chan does appear to use frequency turn-around to retransmit data to modems for collision detection, Chan does this in an environment different from a hybrid fiber/coax (HFC) network and thus would necessarily involve a different set of problems than an HFC network. For example, Chan is concerned with power levels for signals being transmitted from one modem on its *closed* network to another modem on its *closed* network. Chan is not concerned with getting digital data to a head end for transmission to a point outside the network. Further, the Examiner recognizes that Dapper is an *open* system for transmitting digital data upstream. *Office Action,* ¶4 ("the fiber optic link [] transmits the upstream, digital data to the head end."). Since claim 1 is directed to an *open* system, one of ordinary skill in the art would not be motivated to combine the teachings of Chan (a closed system) with Dapper (an open system) to create the open system of claim 1. Thus, the combination of Chan and Dapper is not proper. Further, Eng provides no additional motivation to fill this void. Eng is not concerned with detecting collisions. Rather, Eng appears to address checking addresses in packets prior to concentration.

The Examiner asserts that it would have been obvious to combine Dapper and Chan "to ensure that the information is properly transmitted." Office Action, p. 3, line 22. Further, the Examiner asserts that it is proper to combine Dapper and Chan with Eng "to prevent corrupted upstream, digital data from being passed on to the head end." Office Action, p. 4, lines 13-14. The Examiner fails to give any evidentiary basis, e.g., a citation to a teaching in a prior art reference, to support this assertion as to why these combinations need to be made. The Examiner fails to provide an evidentiary basis as to the problems with Dapper that would motivate one of

skill in the art to combine these references. There is nothing in the record that indicates that there is a problem with corrupted transmissions in Dapper that would lead one of ordinary skill in the art to combine the references. The Examiner has merely engaged in hindsight reconstruction of the invention.

Further, none of the references teach or suggest digital transmission between an optical distribution node and a head end in a hybrid fiber/coax network as called for in claim 1.

Therefore, claim 1 is not obvious. Applicant respectfully requests reversal of the rejection.

Claims 2-4, 6, 9

Claims 2-4, 6, and 9 depend directly or indirectly from claim 1. Claims 2-4, 6, and 9 are likewise patentable for the same reasons stated above with respect to Claim 1 and because of the additional features recited therein.

Claim 18

Claim 18 is directed to an optical distribution node that provides an integral portion of an all digital return path for an HFC network. As with claim 1, the optical distribution node provides a digital data path that receives digital data on a shared frequency band for upstream communication from a coaxial cable from a plurality of modems. The optical distribution node has a data interface that determines whether data is corrupted due to collision prior to forwarding the data to a data concentrator for transmission to a head end for possible further. Thus, claim 18 contains similar elements to claim 1 that distinguish over the art. Further, as discussed above, the combination of references is improper. Therefore, for the reasons provided above with respect to claim 1, claim 18 is also not obvious over the art. Reversal of the rejection is respectfully requested.

Claims 20, 22, and 23

Claims 20, 22, and 23 include the limitations of claim 18 and are likewise patentable for the same reasons stated above with respect to Claim 18 and because of the additional features recited therein.

The Examiner rejected claim 5 under 35 U.S.C. §103(a) as being unpatentable over Dapper et al. ('683) in view of Chan et al. ('825) and further in view of Eng et al. ('451) as applied to claim 1, further in view of Kavehrad (U.S. Patent No. 4,701,909), and further in view of Greising (U.S. Patent No. 4,959,829). Applicant respectfully requests that the Board reverse this rejection.

2. Claim 5 depends from claim 1. Applicant thus incorporates the arguments applied to claim 1 above to traverse this rejection of claim 5. Applicant asserts that none of the references alone or in combination teach or suggest the network of claim 5 for the reasons provided above with respect to claim 1. Further, Applicant traverses the combination of references provided by the Examiner. As discussed above, there is no motivation to combine Dapper, Chan and Eng. Further, there is no teaching or suggestion in the references that justifies the modification of Dapper, Chan and Eng with two other references to incorporate the claimed collision detection signal. The Examiner states that it would be obvious to combine Dapper, Chan and Eng with Kavehard to "allow other transmitters to take proper steps to ensure that the collision does not lead to more collisions." Office Action, p. 6, lines 19-20. Further, the Examiner asserts that it would be obvious to combine these four references with Griesing "in order to prevent the collision detection signal from being confused with another signal." Office Action, p. 7, lines 6-7. Again, the Examiner provides no evidentiary support for these asserted motivations. Therefore the rejection is improper. Reversal of the rejection is respectfully requested.

3. The Examiner rejected claim 7 under 35 U.S.C. §103(a) as being unpatentable over Dapper et al. ('683) in view of Chan et al. ('825), further in view of Eng et al. ('451), as applied to

claim 1, and further in view of Peyrovian (U.S. Patent No. 5,768,682). Applicant respectfully requests that the Board reverse this rejection.

Claim 7 depends indirectly from claim 1. Applicant thus incorporates the arguments applied to claim 1 above to traverse this rejection of claim 7. Applicant asserts that none of the references alone or in combination teach or suggest the network of claim 7 for the reasons provided above with respect to claim 1. Further, Applicant traverses the combination of references provided by the Examiner. There is no teaching or suggestion in the references that justifies the modification of Dapper with these three other references to achieve the claimed invention. The Examiner asserts that it would have been obvious to combine Peyrovian with the other three references "to make the upstream, digital data less susceptible to noise." The Examiner provides no evidentiary basis to support this assertion. Further, the Examiner provides no explanation why the combination of Dapper, Chan and Eng requires this modification. Therefore the rejection is improper. Reversal of the rejection is respectfully requested.

4. The Examiner rejected claims 8 and 21 under 35 U.S.C. §103(a) as being unpatentable over Dapper et al. ('683) in view of Chan et al. ('825), further in view of Eng et al. ('451) as applied to claims 1 and 18, and further in view of Beveridge (U.S. Patent No. 5,469,495). Respectfully, Applicant disagrees.

Claim 8 depends from claim 1. Applicant thus incorporates the arguments applied to claim 1 above to traverse this rejection of claim 8. Applicant asserts that none of the references alone or in combination teach or suggest the network of claim 8 for the reasons provided above with respect to claim 1. Further, Applicant traverses the combination of references provided by the Examiner. There is no teaching or suggestion in the references that justifies the modification of Dapper with these three other references to achieve the claimed invention. The Examiner asserts that the combination is obvious "because sending base-band signals requires less mechanisms and so is simpler than sending band-pass signals." Office Action, p. 8, lines 14-15. The Examiner provides no evidentiary basis for this assertion. Further, the Examiner provides no

reason or evidence why Dapper would need this modification. Therefore the rejection is improper. Reversal of the rejection is respectfully requested.

Claim 21 depends from claim 18. Applicant thus incorporates the arguments applied to claim 18 above to traverse this rejection of claim 21. Applicant asserts that none of the references alone or in combination teach or suggest the network of claim 21 for the reasons provided above with respect to claim 18. Further, Applicant traverses the combination of references provided by the Examiner. There is no teaching or suggestion in the references that justifies the modification of Dapper with these three other references to achieve the claimed invention. The Examiner asserts that the combination is obvious "because sending base-band signals requires less mechanisms and so is simpler than sending band-pass signals." Office Action, p. 8, lines 14-15. The Examiner provides no evidentiary basis for this assertion. Further, the Examiner provides no reason or evidence why Dapper would need this modification. Therefore the rejection is improper. Reversal of the rejection is respectfully requested.

5. The Examiner rejected claim 19 under 35 U.S.C. §103(a) as being unpatentable over Dapper et al. ('683) in view of Chan et al. ('825) and further in view of Eng et al. ('451) as applied to claim 18, and further in view of Hutchison et al. (U.S. Patent No. 5,838,989). Respectfully, Applicant disagrees.

Claim 19 depends from claim 18. Applicant thus incorporates the arguments applied to claim 18 above to traverse this rejection of claim 19. Applicant asserts that none of the references alone or in combination teach or suggest the network of claim 19 for the reasons provided above with respect to claim 18. Further, Applicant traverses the combination of references provided by the Examiner. There is no teaching or suggestion in the references that justifies the modification of Dapper with these three other references to achieve the claimed invention. The Examiner asserts that the combination is proper because it would "allow a device to communicate over that medium." Office Action, p. 9, line 8. The Examiner fails to provide an evidentiary basis for this assertion. The Examiner further fails to indicate why the

modification is needed. Therefore the rejection is improper. Reversal of the rejection is respectfully requested.

6. The Examiner rejected claims 10-12, 14, and 17 under 35 U.S.C. §103(a) as being unpatentable over Dapper et al. ('683) in view of Chan et al. ('825). Respectfully, Applicant requests that the Board reverse this rejection.

Claim 10

Claim 10 calls for a hybrid fiber-coax network that includes a head end, at least one optical distribution node coupled to the head end over at least one fiber optic link to provide upstream, digital data to the head end and at least one coaxial cable link, coupled to the at least one optical distribution node, that receives the upstream, digital data from a plurality of modems. At least a portion of the upstream, digital data is transmitted over the at least one coaxial cable link on at least one modulated carrier below a frequency range for downstream transmission and the at least one optical distribution node includes circuitry for retransmitting upstream, digital data back over the at least one coaxial cable link to detect collisions on the at least one coaxial cable link.

As discussed above with respect to claim 1, there is no teaching, suggestion or motivation to combine Dapper and Chan. Thus, the combination is improper and the rejection cannot stand. Further, the combination of Dapper with Chan would not provide for transmission of digital data received from the coaxial cable links over the fiber to the head end as Chan teaches a closed system and thus would not extend to an open system. Therefore, claim 10 is also not obvious. Reversal of the rejection is respectfully requested.

Claims 11, 12, 14, and 17

Claims 11, 12, 14, and 17 depend directly or indirectly from claim 10. As such, claims 11, 12, 14 and 17 are likewise patentable for the same reasons stated above with respect to Claim 10 and because of the additional features recited therein.

7. The Examiner rejected claim 13 under 35 U.S.C. §103(a) as being unpatentable over Dapper et al. ('683) in view of Chan et al. ('825) as applied to claim 10, and further in view of Kavehrad ('909), and further in view of Griesing ('829). Respectfully, Applicant requests that the Board reverse this rejection.

Claim 13 depends from claims 10. Applicant thus incorporates the arguments applied to claim 10 above to traverse this rejection of claim 13. Applicant asserts that none of the references alone or in combination teach or suggest the network of claim 10 for the reasons provided above. Further, Applicant traverses the combination of references provided by the Examiner. There is no teaching or suggestion in the references that justifies the modification of Dapper with these three other references to achieve the claimed invention. The Examiner asserts that the combination is proper because it prevents "the collision detection signal from being confused with another signal." Office Action, p. 12, lines 11-12. The Examiner provides no evidentiary basis for this assertion. Further, the Examiner provides no evidentiary basis for the what is lacking without the combination. Therefore the rejection is improper. Reversal of the rejection is respectfully requested.

8. The Examiner rejected claim 15 under 35 U.S.C. §103(a) as being unpatentable over Dapper et al. ('683) in view of Chan et al. ('825) as applied to claim 10, and further in view of Peyrovian ('682). Respectfully, Applicant disagrees.

Claim 15 depends from claim 10. Applicant thus incorporates the arguments applied to claim 10 above to traverse this rejection of claims 15. Applicant asserts that none of the references alone or in combination teach or suggest the network of claim 10 for the reasons provided above. Further, Applicant traverses the combination of references provided by the Examiner. There is no teaching or suggestion in the references that justifies the modification of Dapper with two other references to achieve the claimed invention. The Examiner states that the combination is proper because it makes "the upstream, digital data less susceptible to noise." Office Action, p. 13, lines 2-3. The Examiner fails to provide an evidentiary basis for this asserted motivation and why this combination is needed with the other references. Therefore the rejection is improper. Reversal of the rejection is respectfully requested.

9. The Examiner rejected claim 16 under 35 U.S.C. §103(a) as being unpatentable over Dapper et al. ('683) in view of Chan et al. ('825) as applied to claim 10, and further in view of Beveridge ('495). Respectfully, Applicant requests that the Board reverse the rejection.

Claim 16 depends from claim 10. Applicant thus incorporates the arguments applied to claim 10 above to traverse this rejection of claim 16. Applicant asserts that none of the references alone or in combination teach or suggest the network of claim 10 for the reasons provided above. Further, Applicant traverses the combination of references provided by the Examiner. There is no teaching or suggestion in the references that justifies the modification of Dapper with these two other references to achieve the claimed invention. The Examiner asserts that the combination is obvious "because sending base-band signals requires less mechanisms and so is simpler than sending band-pass signals." Office Action, p. 13, lines 17-18. The Examiner provides no evidentiary basis for this assertion. Further, the Examiner provides no reason or evidence why Dapper would need this modification. Therefore the rejection is improper. Reversal of the rejection is respectfully requested.

10. The Examiner rejected claims 24, 25, and 29 under 35 U.S.C. §103(a) as being unpatentable over Dapper et al. ('683) in view of Chan et al. ('825), and further in view of Usi (U.S. Patent No. 4,531,239). Respectfully, Applicant requests that the Board reverse the rejection.

Claim 24

Claim 24 is directed to a method for processing data in a return path of a hybrid fiber/coax network. The method includes receiving, on a first coaxial cable, upstream, digital data modulated on a first carrier, translating the frequency of the first carrier to a second frequency, and retransmitting the upstream, digital data modulated on the carrier with the second frequency. The method checks for collisions detection signals based on the retransmitted upstream, digital data. The method further concentrates the upstream, digital data with upstream, digital data from other coaxial cables and transmits the concentrated, upstream, digital data to the head end.

None of the references, alone or in combination, teach or suggest the method of processing data in a return path of a hybrid fiber/coax network as called for in claim 24. None of the references, alone or in combination teach or suggest detecting collisions based on retransmitted upstream, digital data and transmitting the concentrated digital upstream data to the head end. Further, neither of the references, teach nor suggest digital transmission between the optical distribution node and a head end of a hybrid fiber/coax network.

Applicant further traverses the appropriateness of the combination of Dapper with Chan for the reasons identified above. Further, the Examiner provides no evidentiary basis for combining Dapper and Chan with Usui. The Examiner simply makes the conclusory statement that the combination is proper "to determine if a received packet was corrupted by a collision." Office Action, p. 14, lines 19-20. Therefore, claim 24 is not obvious. Reversal of the rejection is respectfully requested.

Claims 25 and 29

Claims 25 and 29 depend from claim 24 and thus are are likewise patentable for the same reasons stated above with respect to Claim 24 and because of the additional features recited therein.

11. The Examiner rejected claim 26 under 35 U.S.C. §103(a) as being unpatentable over Dapper et al. ('683) in view of Chan et al. ('825), further in view of Usi ('239) as applied to claim 24, and further in view of Peyrovian ('682).

Claim 26 depends from claim 24. Applicant thus incorporates the arguments applied to claim 24 above to traverse this rejection of claim 26. Applicant asserts that none of the references alone or in combination teach or suggest the method of claim 24 for the reasons provided above. Further, Applicant traverses the combination of references provided by the Examiner. There is no teaching or suggestion in the references that justifies the modification of Dapper with these two other references to achieve the claimed invention. The Examiner asserts that it would have been obvious to combine Peyrovian with the other three references "to make the upstream, digital data less susceptible to noise." Office Action, p. 15, lines 18-19. The Examiner provides no evidentiary basis to support this assertion. Further, the Examiner provides no explanation why the combination of Dapper, Chan and Usui requires this modification. Therefore the rejection is improper. Reversal of the rejection is respectfully requested.

12. The Examiner rejected claim 27 under 35 U.S.C. §103(a) as being unpatentable over Dapper et al. ('683) in view of Chan et al. ('825), further in view of Usi ('239) as applied to claim 24, and further in view of Griesing ('829).

Claim 27 depends from claim 24. Applicant thus incorporates the arguments applied to claim 24 above to traverse this rejection of claim 27. Applicant asserts that none of the

references alone or in combination teach or suggest the method of claim 24 for the reasons provided above. Further, Applicant traverses the combination of references provided by the Examiner. There is no teaching or suggestion in the references that justifies the modification of Dapper with these three other references to achieve the claimed invention. The Examiner asserts that the combination is proper because it allows the determination of whether "a collision had or had not occurred." Office Action, p. 16, lines 11-12. The Examiner provides no evidentiary basis for this assertion. Further, the Examiner provides no evidentiary basis for what is lacking without the combination. Therefore the rejection is improper. Reversal of the rejection is respectfully requested.

13. The Examiner rejected claim 28 under 35 U.S.C. §103(a) as being unpatentable over Dapper et al. ('683) in view of Chan et al. ('825), further in view of Usi ('239) as applied to claim 24, and further in view of Beveridge ('495).

Claim 28 depends from claim 24. Applicant thus incorporates the arguments applied to claim 24 above to traverse this rejection of claim 28. Applicant asserts that none of the references alone or in combination teach or suggest the method of claim 24 for the reasons provided above. Further, Applicant traverses the combination of references provided by the Examiner. There is no teaching or suggestion in the references that justifies the modification of Dapper with these two other references to achieve the claimed invention. The Examiner asserts that the combination is obvious "because sending base-band signals requires less mechanisms and so is simpler than sending band-pass signals." Office Action, p. 17, lines 4-5. The Examiner provides no evidentiary basis for this assertion. Further, the Examiner provides no reason or evidence why Dapper would need this modification. Therefore the rejection is improper. Reversal of the rejection is respectfully requested.

Conclusion

Applicants respectfully assert that claims 1-29 are allowable over the art of record. Respectfully, Applicants request that the Board reverse the decision of the Examiner.

Respectfully submitted,

Date: 10/31/2003

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Appendix 1

The Claims on Appeal

1. A hybrid fiber/coax network, comprising:

a head end;

at least one optical distribution node coupled to the head end over at least one fiber optic link;

at least one coaxial cable link, coupled to the at least one optical distribution node, that receives upstream, digital data from a plurality of modems; and

wherein the at least one optical distribution node has a digital return path that includes:

a laser transmitter coupled to the fiber optic link that transmits the upstream, digital data to the head end;

a data concentrator coupled to provide the upstream, digital data to the laser; and

for the at least one coaxial cable link,

a frequency translator that receives and translates the upstream, digital data from the plurality of modems to a different carrier frequency and retransmits the signal to the plurality of modems for collision detection; and

a data interface coupled between frequency translator and the data concentrator that determines whether a collision occurred with the upstream, digital data so as to prevent corrupted upstream, digital data from being passed on to the head end.

2. The network of claim 1, wherein at least a portion of the upstream, digital data is transmitted over the at least one coaxial cable link on modulated carriers below 42 MHZ.

3. The network of claim 1, wherein the modulated carriers are modulated with the upstream, digital data using one of on-off-keying, quadrature phase-shift keying and quadrature amplitude

modulation.

4. The network of claim 1, wherein the upstream, digital data is carried on one of at least two modulated carriers.

5. The network of claim 1, wherein the plurality of modems transmit collision detection signals on a different modulated carrier when a collision is detected based on signals from the frequency translator.

6. The network of claim 1, wherein the upstream, digital data comprises Ethernet packets.

7. The network of claim 2, wherein at least another portion of the upstream, digital data is transmitted over the plurality of coaxial cable links on modulated carriers above a cut-off frequency for downstream transmissions.

8. The network of claim 1, wherein the laser transmitter transmits the upstream, digital data as one of base-band and modulated carrier transmission.

9. The network of claim 1, and further including a receiver circuit coupled to the fiber optic link and the at least one coaxial cable link that receives downstream optical signals and converts the signals to electrical signals for transmission over the at least one coaxial cable link.

10. A hybrid fiber-coax network, comprising:

a head end;

at least one optical distribution node coupled to the head end over at least one fiber optic link to provide upstream, digital data to the head end;

at least one coaxial cable link, coupled to the at least one optical distribution node, that

receives the upstream, digital data from a plurality of modems;

wherein at least a portion of the upstream, digital data is transmitted over the at least one coaxial cable link on at least one modulated carrier below a frequency range for downstream transmission; and

wherein the at least one optical distribution node includes circuitry for retransmitting upstream, digital data back over the at least one coaxial cable link to detect collisions on the at least one coaxial cable link.

11. The network of claim 10, wherein the modulated carriers are modulated with the upstream, digital data using one of on-off-keying, quadrature phase-shift keying and quadrature amplitude modulation.

12. The network of claim 10, wherein the upstream, digital data is carried on one of at least two modulated carriers.

13. The network of claim 10, wherein the plurality of modems transmit collision detection signals on a different modulated carrier when a collision is detected based on signals from a frequency translator.

14. The network of claim 10, wherein the upstream, digital data comprises Ethernet packets.

15. The network of claim 10, wherein at least another portion of the upstream, digital data is transmitted over the at least one coaxial cable link on modulated carriers above a cut-off frequency for the downstream transmissions.

16. The network of claim 10, wherein the at least one optical distribution node transmits the upstream, digital data as one of base-band and modulated carrier transmission.

17. The network of claim 10, and further including a receiver circuit coupled to the fiber optic link and the at least one coaxial cable link that receives downstream optical signals and converts the signals to electrical signals for transmission over the at least one coaxial cable link.

18. An optical distribution node for an hybrid fiber/coax network, the optical distribution node comprising:

a laser transmitter coupleable to a fiber optic link that transmits upstream, digital data to a head end of the network;

a data concentrator coupled to provide the upstream, digital data to the laser; and

for at least one coaxial cable link of the network coupleable to the optical distribution node,

a frequency translator that receives the upstream, digital data modulated on a first carrier frequency from a plurality of modems and translates the upstream, digital data to a different carrier and retransmits the upstream, digital data to the plurality of modems for collision detection; and

a data interface coupled between the at least one coaxial cable link and the data concentrator that determines whether the upstream data is valid. a collision occurred with the upstream data so as to prevent corrupted upstream, digital data from being passed on to the head end.

19. The node of claim 18, and further including at least one media access unit coupled to the at least one coaxial cable link and the data concentrator.

20. The node of claim 18, wherein the upstream, digital data comprises Ethernet packets.

21. The node of claim 18, wherein the laser transmitter transmits the upstream, digital data as

one of base-band and modulated carrier transmission.

22. The node of claim 18, wherein the frequency translator also receives upstream, digital data on at least one additional carrier.

23. The node of claim 18, wherein the frequency translator receives the upstream, digital data modulated on a first carrier with a frequency that is below the frequency range for downstream transmissions.

24. A method for processing data in a return path of a hybrid fiber/coax network, the method comprising:

receiving, on a first coaxial cable, upstream, digital data modulated on a first carrier;

translating the frequency of the first carrier to a second frequency;

retransmitting the upstream, digital data modulated on the carrier with the second frequency;

checking for collision detection signals based on the retransmitted upstream, digital data;

concentrating the upstream, digital data with upstream, digital data from other coaxial cables; and

transmitting the concentrated, upstream, digital data to the head end.

25. The method of claim 24, wherein receiving digital data comprises receiving digital data on a first carrier below a frequency range for downstream transmission.

26. The method of claim 24, wherein translating the frequency of the first carrier comprises translating the frequency of the first carrier to a second frequency below the frequency used for downstream transmission.

27. The method of claim 24, wherein checking for collision detection signals comprises monitoring a third frequency for collision detection signals.

28. The method of claim 24, wherein transmitting the concentrated, upstream, digital data comprises transmitting base-band signals as one of base-band and modulated carrier transmission.

29. The method of claim 24, wherein receiving, on a coaxial cable, upstream, digital data comprises receiving Ethernet packets on a modulated carrier.